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ABSTRACT

A computer-oriented, classroom-based research project was conducted at Thomas Nelson Community College in Hampton, Virginia, to explore the ways in which students in a composition and literature class might use a local area network (LAN) as a catalyst to critical thinking, to construct a decentralized classroom, and to use various forms of discourse. The project focused on 49 freshmen enrolled in spring 1992 in two sections of a college composition course that develops writing skills through reflection on literary texts and culture. Students used interactive computer tutorials to analyze essays, plot, and characterization; and posted their work on the LAN electronic bulletin board for comments by other students and the instructor. Several times during the semester, instructors asked students to generate their own critical questions about the texts being read. Data on student progress were gathered through a writing attitude survey, a computer-assisted instruction attitude survey, and a typology used to rank the degree of complexity of students' questions. Study findings included the following: (1) the use of computers appeared to have less influence on attitudes toward writing than did the instructor assigned to the section; (2) most students reported that the computers were easy to learn; (3) students' questions resisted simple categorization through the typology; and (4) the degree of complexity of the questions did not correlate with final course grades. Recommendations concerning hardware and software, student and teacher preparation, and use of LANs are included. (Contains 15 references.) (PAA)

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Critical Thinking about Literature through Computer Networking.

by

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Paper presented at the Annual Computer Conference of the League for Innovation in the Community College (9th, Orlando, FL, October 21-24, 1992)

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Critical Thinking About Literature Through Computer Networking

Since the mid-1980s when personal computers first became widely available, English departments at colleges and universities have used this technology in composition and literature instruction with varied and sometimes ambiguous results. Most early work with computer assisted instruction used the PC as a word processor--the irreplaceable tool that it remains today not only for students of literature and composition but for faculty as well. But only toward the end of the decade did we begin to explore the wider possibilities for networked telecommunication in the classroom, going beyond issues of word processing and writing improvement to questions about electronic discourse, critical reflection, and electronic resource exchange. With computer networks, particularly the entry-level local area network (or LAN), instructors and students of composition and literature have an opportunity to catalyze critical thinking, construct a decentered classroom, and deploy a variety of discourse forms.

I. Setting

Our classroom-based research has explored how students in a composition and literature class might use a LAN to develop critical thinking skills. The 49 students in this research were

registered during Spring 1992 in ENG 112, College Composition II, a course that develops writing skills through reflection on literary texts and culture. These students were all freshmen at Thomas Nelson Community College in Hampton, Virginia, a two-year state community college with an FTE enrollment of about 3500 students. Our students were "typical" in that they represented the expected diversity of community college students. Some had completed high school only the year before, while others were returning to college after several years away from school.

The college's Computer Assisted Classroom in the Humanities uses 24 PC-type computers linked together by means of Banyan VINES networking software. In the classroom we made use of Helen Schwartz's Seen software, which employs tutorials to analyze essays, plot, characterization, and other aspects of writing and literature. Seen requires students to interact with the software through a series of prompts or questions; students then post their work on the network's electronic bulletin board where other students and the instructor can comment. They can also save their work as text files on their own floppy disks. After students followed a Seen tutorial to analyze and develop ideas about a work of literature, they used a network version of WordPerfect 5.1 to draft, revise, and edit their papers. We also used an electronic mail service that allowed students to communicate with us and with each other, another form of discourse that further decentered the classroom. In addition to these computers, students had access to the Academic Computing

Lab where stand-alone PCs are available seven days each week.

II. Praxis (Reflective Action)

A. Theory

We began our research in the winter of 1991 with several questions:

> How can we help students write more analytically about what they read?
>
> How can we enhance critical reading, critical thinking, and critical writing?
>
> How can a computer local area network enhance student learning of critical activity?

In addition other research into the teaching of writing, critical reading, or literature using computers leaves many questions unanswered about the effectiveness of computer assisted instruction.

Some researchers have been interested in the connection between computers and critical thinking. A few have been specifically interested in computer assisted critical thinking in composition, while others have seen computers as part of larger metacognitive learning.

Among the earliest researchers concerned with critical composition, Valarie M. Arms suggested in a paper presented at the 1982 Annual Meeting of the Conference on College Composition and Communication ("The Computer Kids and Composition") that computerized word processing freed up student writers to read

more critically their own drafts from printouts by easing much of the tediousness of writing. Christina Haas' "What Research with Computers Can Tell Us about the Uses of Reading in Writing," a paper presented at the 1987 Annual Meeting of the CCCC, further explored the concern that writers could not critically read their drafts on screen, but could with paper hard copies. Ilene Kantrov in a 1991 article for Computers and Composition ("Keeping Promises and Avoiding Pitfalls: Where Teaching Needs to Augment Word Processing") reiterated that critical reading of their own writing drafts is inhibited by students' inability to see an entire document on the screen.

As early as 1983, Joan Baum explored the possibilities of computer assisted instruction in the development of students' critical thinking in her monograph, Computers in the English Class, with Particular Attention to the City University of New York. Joanne C. Strohmer's 1987 "Are We Using Technology to Train Pigeons or Thinkers?" challenges us to think critically about how we use computers in the classroom. In an article for a 1990 issue of Writing Notebook: Creative Word Processing in the Classroom, Audrey Chan describes using computers to structure and develop a hierarchy of critical thinking skills. Andrea W. Herrmann's 1989 article "Computers and Writing in Gifted Education" explores computer assisted instruction and critical thinking with the academically gifted.

Thomas Long's classroom work began to focus on praxis in a new way during the summer of 1990 when he participated in a

colloquium in classroom-based research for teachers of English led by Kathleen Bell, then at Old Dominion University in Norfolk, Virginia. He had been teaching at Thomas Nelson Community College for the previous year, experiencing all the pleasures and frustrations of a returning professor working with many returning students. Among the frustrations was the difficulty many students had responding to complex abstract texts (frustrating for him and for them in different ways). Many students resorted to narrative when he wanted analysis, and the essays, articles, and analytical pieces that one reads in a typical composition course, they tended to call "stories."

The research methodology we used came out of the ODU summer colloquium. Our approach was contextualist as defined by Miles Myers in his 1985 The Teacher-Researcher: How to Study Writing in the Classroom. In particular we were informed by many of the classroom-based research strategies included by Dixie Goswami and Peter R. Stillman Reclaiming the Classroom: Teacher Research as an Agency for Change, published in 1987. Here our attempt was to develop what Clifford Geertz and others have called "thick data."

We developed data from several sources. During the semester we each kept research journals. At the beginning and the end of the semester we used Janet Emig's writing attitude survey. And throughout the semester we each posed writing prompts to elicit students' questions about the texts we had read.

The interest in questions comes in part from the critical praxis of literacy educator Paulo Freire. Freire, whose work

first came to Thomas Long's attention in the late 1970s, suggests a three-stage critical process:

1. Observe your situation.
2. Pose questions of the contradictions.
3. Take action.

Without referring to Freire, Leila Christenbury and Patricia P. Kelly in Questioning: A Path to Critical Thinking explore some of the same issues in the classroom. Their research looks at the ways teachers use questions to stimulate critical thinking and writing from students. They note research that indicates the value during pre-writing of students' questions of themselves and of their peers (Schwartz; Zoellner; Wixon and Stone). Christenbury and Kelly also identify question hierarchies, both sequential and nonsequential, that others have developed, but caution that such hierarchies can be rigid and arbitrary. For example we used Benjamin Bloom's hierarchy:

To know
To comprehend
To apply
To analyze
To synthesize
To evaluate.

However, we know that in conversation people often shift back and forth from one level of question to another with relative ease. People do not simply begin with knowing and comprehension questions and rise finally to valuative ones. Moreover,

Christenbury and Kelly cite research that indicates that a teacher's predominant use of "higher order" questions will not produce increased learning (6-7). Their inquiry, however, primarily concerns how teachers use questions, not the repertoire of questions that students have, learn, or develop as a function of developing critical thinking.

It seems reasonable to expect, however, that if a teacher stimulates learner questioning and encourages opportunities for action based on these questions, many students will respond with keener responses. For the writing course this expectation implies that student writing will be more clear, specific, and insightful through such a pedagogy.

The insights of deconstructive readings during the past decade have also suggested where our interest in questions and in classroom computer networks might intersect. Deconstructive readings indicate that texts are open to question because the texts' linguistic and rhetorical apparatuses have been exposed or decentered. Our experience over the last couple of years has led us to believe that the computer-networked classroom is similarly decentered. Likewise, some deconstructive readers speak of "interrogating the text," which is what we hoped our students would be more free to do with computer assistance.

We hoped that the computer network would make our teacher research more effective and enable our students to pose more sophisticated, more complex, more thoughtful questions.

B. Practica

Christine Pedersen. Students generally find 112 difficult. In fact, a survivor of the course suggested it should come with a skull and cross-bones as a warning label. One reason it seems so difficult is that reading literary texts analytically and then writing about them calls for a spectrum of critical thinking skills to be applied to a variety of tasks. We hypothesized that if our students could internalize the prompts that experienced readers ask of texts as they read, and continue to ask as they evaluate and write about texts, then our students would develop stronger critical thinking skills and be more successful in 112.

When we sat down to plan our project, sharpening the students' abilities was our primary concern; the method we chose to test our theory was secondary. Since we both teach with computers, and see their usefulness to students as writing tools demonstrated on a daily basis in the classroom, we wondered if this couldn't be taken a step further, with computers helping shape student responses to texts. Computers, with their infinite patience and flexibility, seemed the ideal way to question students and to encourage them to question. What we learned can be separated into two categories: what we learned about questions, and what we learned about computers.

As Christine Pedersen regularly teaches ENG 112, with or without computers in the classroom, she invites students to read the questions following the text first, as a way of approaching the work. This time, however, her emphasis on questioning as a

necessary critical thinking skill was much more pronounced--from using red question mark tags on computer tops (so students wouldn't have to stop typing and wave their hands if they had questions for the instructor), to assigning interactive computer tutorials that asked them questions and asked them to question, to having them both ask and answer their own tutorial and exam questions. Along with time in the academic computing lab, her students logged in many hours on the network, daily checking mail, exchanging messages, or chatting with each other before class. Pedersen and her students used the computers for a third of the class time, generally in WordPerfect or Seen tutorials, answering electronically prompted questions. Students weren't bothered by Pedersen's questions, but were less confident in their own questioning. This may be because critical questioning assumes a framework, some kind of reference point in approaching a subject, and her students generally had low entry level knowledge about literature. But even students who responded with alacrity to a questioning prompt of hers, or of the Seen tutorial, were hesitant when it came to voicing a question, or writing one down. Questioning was, for them, an admission of ignorance.

Another possible reason her students were uncomfortable using this Socratic-method-with-a-twist was that not knowing if the question was the "correct" question bothered them--as it bothered her in evaluating the questions. The fact, she now admits, that she unquestioningly graded them on acquired

knowledge, not solely on the ability to question, says something about the scale of value we unconsciously assign to critical thinking as opposed to the "right" answer. And since the types of assignments were often of two parts, requiring the student to pose a question and provide an answer, many of the questions formulated were on the lower Bloom levels. Students may have been able to formulate more sophisticated questions if they hadn't been compelled to answer them.

Developing a critical thinking skill takes time, and the 15 week period of the course may not have been enough to detect the kinds of significant increases we were hoping for. Certainly time seemed to be a factor on a smaller scale, with questions students posed during timed, in-class assignments being lower on the evaluation scale that those given for out-of-class assignments. This may also be working in conjunction with other factors, such as location and comfort-level of the student during the questioning.

Thomas Long. Classroom rituals and ritual spaces are important and useful. As part of the classroom ritual Thomas Long asks students to log in on the network daily. He has usually left e-mail for the class or for individuals and he encourages their responses. Usually on Mondays students are working on a Seen tutorial, either focusing on a particular work they have all read or on another reading selection in preparation for the next paper assignment. One of the advantages of the Seen tutorials is that since students' tutorial work is posted on a

network electronic bulletin board for other students and the instructor to see, students tend to be more prepared for class. It still often takes a couple of weeks to discover how much easier it is to say something intelligent about a literary work when one has read it. Again on Friday, Long and his students usually work at the computer, typically in WordPerfect preparing a draft of the next paper. On Wednesday participants typically sit at the classroom's conference table in an oral discussion of the readings; sometimes Long uses this swing day of the week to have students working in groups using Freire's three-stage praxis model to interrogate a text, an assignment, or the course.

In addition to standard activities as peer reviewers of each other's work, student groups work together brainstorming ideas for the next paper or reflecting on the construction of the previous assignment. In addition, these groups are useful as a substitute to the larger whole-class discussion, in which it is easy for the instructor, or a couple of students, to dominate. Long finds that these groups benefit from some guidance and he offers a set of questions that they might ask under the format of Freire's praxis model.

Praxis education invites people to look at their own life stories and reflect on those stories in the light of a larger culture story or tradition. The clearest articulation of praxis education is in the work of Paulo Freire, particularly his classic Pedagogy of the Oppressed. Freire's critical praxis has three stages:

1. **Observe the situation.** Long asks students to observe the literary texts, the cultural texts, and the classroom text. It is as important that students are attentive to what is going on in the culture of the classroom as in the literary culture.

2. **Ask questions (particularly about contradictions in the situation).** Long invites students to interrogate not only the literary text, but the larger cultural contexts, including the classroom culture in that section of the course at the college.

3. **Take action.** In the writing classroom this step is usually to read, research, write, discuss, and persuade. Of course, Long has also found that it may occasionally involve political action: students' taking initiative to negotiate course expectations and more overtly control their learning.

This third stage leads to further observation, questions, and action. One does not apply theory into practice, but allows theory to emerge from **praxis**, that is, critically reflected action. In this respect Freire's method differs from other dialectical Western teaching reaching back to Socrates: it is self-consciously political.

"Political" in the classroom can mean many different things, but what Long at least intends by the word is that students are not only interrogating texts of literary culture but that they are also interrogating the texts of classroom culture: the

syllabus, the textbook, the software, his classroom management, their own writing, each other. In the political classroom students take action after they observe the text and interrogate its contradictions. This has meant frequent negotiations between Long and his students on the syllabus, on literary interpretations, and on classroom management of the course. During a few weeks in a recent semester Long was told (not by the same student) that he was not teaching or giving direction enough, that the scheduling of peer draft reviews was not timely, and that the poetry analysis tutorial he designed for Helen Schwarz's Seen was not consistent with the assigned poetry explication paper (a contradiction that Long realized resulted from his cultural-criticism hemisphere working independently from his formalist hemisphere).

The Seen tutorial that Thomas Long designed, called "Cultural Poetics," attempts to surface not simply the formal features of a poem that the student wishes to analyze. The tutorial also attempts to analyze the broader cultural issues enscribed in a poem. This tutorial invites students to consider dominant cultures and marginal cultures, the cultural position of the poet, and their own cultural positions, in addition to asking them to list any questions that the poem raises for them.

III. Data

We frame our data and the conclusions that we've reached as tentative and provisional, the current state of on-going

research.

In addition to keeping research logs, we accumulated data from three sources: Janet Emig's Writing Attitude Survey; an Attitude Survey of Computer-Assisted Instruction drafted by Thomas Long; and students' questions assigned a Bloom typology by each instructor.

A. Emig Writing Attitude Survey

One of the instruments we used is the Emig Writing Attitude Scale, which is designed to measure student attitudes about writing. The three categories represented by 40 declarative statements are preference for writing, perception of writing, and the process of writing. Respondents circled responses ranging from "almost always" to "almost never." We administered the survey as a pre-test in the first week of the semester and a post-test in the last.

In evaluating data of this survey we were looking for changes in attitude reflected by changes in response from whole or partial agreement to a statement to whole or partial disagreement or vice versa. We discovered that the writing attitude survey did not reveal any apparent correlation between instructors. The changes that we noted in the survey seemed instead reflections of the emphases of each instructor. Perhaps the most notable were that at the end of the semester Thomas Long's students perceived themselves buying more books, while Christine Pedersen's students' perceptions of how women enjoyed

writing had a positive increase. This suggests that the computer was a less powerful force in the classroom than the individual instructor and his or her protocols.

B. Attitude Survey of Computer-Assisted Instruction

Another instrument we used was an Attitude Survey of Computer-Assisted Instruction (Appendix). Designed to determine student perceptions of the computer, both inside and outside the classroom, the survey reflected that most students felt the computers were easy to learn to use and effectively integrated in to the class. However, the response to the one statement we were most interested in--"Did the computer help you learn the content of this course?"--received a somewhat divergent set of responses, with Thomas Long's students responding more favorably than Christine Pedersen's by a margin of three to two. This discrepancy may be the result of differing classroom practices. Typically Long had his students use the computers two out of every three class meetings, while Pedersen only had hers use them one out of every three.

C. Bloom Typology of Students' Questions

During the course of the Spring 1992 semester, we designed several prompts in which 49 students were asked to generate questions. We employed these prompts at the beginning, middle and end of the semester. Christine Pedersen employed three; Thomas Long, five. We both asked students in an in-class test to generate questions and answer them. We both asked students in a take-home test to design a Seen tutorial generating at least one

dozen questions (following the model of the Schwarz Seen tutorial they had used on the network). Pedersen's third prompt and Long's two extras, were designed independently of each other. Also independently of each other we assigned Bloom numbers to the accumulated questions of our own students over several days after the end of the semester. Christine Pedersen's 19 students averaged a Bloom number of 2.89; Thomas Long's 30 students, a 2.12, suggesting that our assigning these numbers was adequately calibrated.

Based on the data we have reached four conclusions:

1. **Questions are more complex than we had ever imagined.** Questions resist rigid or hierarchical classification. Bloom's taxonomy may be useful in labeling questions only if we think of each of the six types as "flavors" and that some questions have a mixture of two or more "Bloom flavors." Although up to this point we have used the taxonomy as a sequential hierarchy, trying to determine a "mean" or "average" for the range of each student's questions, we realize the need to reexamine its validity. In particular we need to interrogate the positivist assumptions of our assigning these numbers and the reductionistic method employed.

2. **There is no apparent correlation with the student's final grade.** Although we might have hypothesized that students whose grades were higher than others generated

questions that placed higher on the Bloom taxonomy, the data do not lead to this conclusion. Higher order questions do not necessarily predict a higher course grade. When Bloom numbers for each student were averaged, they ranged from a low of 1.36 (a student who earned a B for the course) to a high of 3.7 (a student who earned a C for the course). Only a reductionist interpretation, of course, would equate developing higher level critical thinking with final grade outcomes. One can easily imagine uncritical students who are eminently successful in garnering high grades.

3. **There is a possible correlation with the site where students generate the questions.** Both of us noted that students' Bloom averages were higher in the take-home test that Pedersen administered in April and Long administered as a final exam in May. While we would like to think that these higher numbers show increased sophistication in posing questions at the end of a semester, we are more inclined to examine the location and circumstances of the prompt. Specifically we wonder if students are more comfortable generating questions outside the classroom and its constraints. Perhaps many students think more clearly and more critically when they are in "rooms of their own" rather than in the classroom. As a corollary students express varying degrees of comfort or discomfort with the

classroom as a writing workshop. Both aspects have implications for how we decide to use a computer-assisted classroom.

4. **Students generally asked fewer higher level questions, with the exception of Bloom type 4 (analytical) questions, which predominated.** In moving from Bloom type 1 to type 6 questions, the trend is toward lower numbers of higher level questions. But this trend is interrupted by the "spike" of type 4 questions (see table below). Characteristic of literary study in our classrooms and of the questions and prompts posed by the Seen tutorials, analytical questions were conspicuous. While we recognize that this predominance could result from our unconscious scoring of the questions around Bloom type 4, we are inclined to dismiss this objection since there were not equivalent larger numbers of types 5 and 6. In other words, we had "hoped" for sophisticated questions of the 4, 5, and 6 type, but apparently did not unconsciously "project" our hopes in our scoring.

Bloom Type	Fact	Inter-pret	Apply	Analyze	Synthe-size	Evalu-ate
Number of Quest-ions	197	149	92	367	38	75

IV. The Computer in the Classroom

The answer we were looking for at the start of our project was, "Computers help students think critically." But the problem is too complex to allow a simple answer. The answer we got was "Students' progress in critical thinking was not readily measurable. All we know with certainty is that they not feel hindered by the computers in the course." This is, in its own way, a valuable answer, and is helpful in defining the role of the computer in the English classroom.

The computer was not seen in a negative light for the majority of the students. But all students were aware of the presence of the computers in the classroom--the environment was different, either from what they expected or what they had encountered before, because it was a computer-assisted classroom. What we need is to make the medium more transparent. This invisibility needs more work in the following ways:

1. **Hardware** needs to be in good working order--as any instructor who has been put in the unenviable position of using computers to teach without technical support knows, the computer that is malfunctioning, eating student documents or spreading viruses, is so highly visible as to become a solid, frustrating barrier for the student and a source of frustration for the instructor. Functioning equipment must be a given in the classroom if the computer is to be transparent. Networked hardware offers a solution to some of the technical problems (eg. viruses) while presenting some new ones of its own.

2. **Software** needs to be developed for specialized applications in classrooms. Teacher-driven at least, if not instructor-authored, is key. To accomplish our specific objectives in our classrooms, for our specialized groups of students, we cannot rely on the "standard" package, any more than we would admit that a handful of texts could possible suit the range of students studying literature across the nation. The split between the software and the content of the course can pose another visible barrier for students. It is the subject-matter experts who must be involved in bringing about the fertile union of teaching and technology.

3. **Students** need to be more computer literate--more familiarity with the concept of computers and keyboarding skills would be ideal, and we anticipate the arrival within several years of the computer literate generation in our classrooms. Yet during these transition years, in order to keep this useful tool in the classroom without teaching "computer" instead of the subject matter, user-friendly computers are of the utmost importance if computers are to be helpful. Reliance on the students' knowledge of DOS, OS/2 or a particular software program brings the focus squarely on the computer; transparency comes when the computer is easy to master.

4. **Teachers** need to be exposed to computers as educational resources--Work such as we have done in this classroom-based research helps to explore the things which the computer does well, to help us discover the particular strengths of the medium

and capitalize on them. Finding what computers are best suited to do can be done most effectively by a group of instructors who will share their experiences with others. But a handful of teachers exploring and utilizing the medium is not enough: we must learn from each other, determinedly avoiding the isolationist approach of the "computer gurus" versus the "technophobes," which is in the best interests of neither education nor educators. Those who may not be experienced in using or teaching with computers must be invited to experience it for themselves, perhaps in informal classes taught by experience instructors.

5. **Local area networks (LAN)** can be both instruments of classroom domination and forums for a splendid, purposeful anarchy. Some of us once had fantasies of monitoring each student's writing in real time while she wrote at the workstation, breaking in to comment on her writing from our central console at the center of the web. While this technology is readily available today, we don't know of anyone who has worked with and researched computer assisted instruction who still wants to make that model a reality.

We have come to observe that creativity and ingenuity occur in decentered, less managed, more free-wheeling settings. While critical thinking requires rigor and discipline, it is hindered by heavy-handed classroom management. The computer assisted classroom on a local area network with its protocols, access security, and linear learning programs, can still be a

totalitarian device. But with the network's multi-layered forms of discourse, matrix of resources, and interconnection of participants, students and faculty are likely to find that the computer network decenters and destabilizes customary modes of teaching and criticism. Anyone who logs on to a computer bulletin board--local boards or national systems like BITNET, INTERNET, or a national resource like ISAAC--knows that such mutual exchange of ideas and criticism is both intimidating and stimulating. It is no less so for students or faculty in the computer assisted classroom.

Only when instructors are comfortable and confident with the hardware and software of computers in the classroom will the computer be used to fullest advantage, a truly transparent medium of learning for the student. Are we willing to make this happen? Perhaps that is the critical question.

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